Claims

1. Device for duplicating and characterizing nucleic acids in a reaction chamber,
characterized in that a chamber body (1) containing an optically permeable chip (2) having a detection area (12), and being optically permeable at least in the zone of the detection area (12) of the chip (2), is sealingly placed on an optically permeable chamber support (5), so that a sample chamber (3) having a capillary gap (7) is formed between the chamber support (5) and the detection area (12) of the chip (2), which is temperature-adjustable and flow-controllable.

2. Device according to claim 1,
characterized in that the temperature adjustment means are connected with the chamber support (5) and permit a rapid heating and/or cooling of the sample chamber (3) having the capillary gap (7).

3. Device according to claim 2,
characterized in that the temperature adjustment means are situated on the side of the chamber support (5) facing towards the chamber body (1).

4. Device according to any one of the preceding claims,
characterized in that the temperature adjustment means (16, 17) are configured in the form of optically transparent thin films and/or are so finely structured that the optical transparency of the chip (2) remains unaffected at least in the zones of the spots (13) of the detection area (12).

5. Device according to claim 4,
characterized in that the temperature adjustment means comprise micro-structured heating elements (17), preferably nickel-chromium thick film resistance heaters and/or micro-structured temperature sensors (16), preferably nickel-chromium thick film resistance sensors.

6. Device according to any one of the preceding claims,
characterized in that the chamber support (5) comprises systems for thoroughly mixing the liquid sample, which are configured in the form of optically transparent thin films and/or are so finely structured that the optical transparency of the chip (2) remains unaffected at least in the zones of the spots (13) of the detection area (12), whereby preferably a quadrupole system for inducing an electro-osmotic flow is concerned.

7. Device according to claim 6,
characterized in that the quadrupole system is realized as gold-titanium electrodes.

8. Device according to any one of the preceding claims,
characterized in that the chamber support (5) and the chamber body (1) preferably consist of glass and/or synthetic material and/or optically permeable synthetic materials particularly preferred of nylon, Teflon, topaz, polycarbonate, polystyrene, PMMA and/or polymethane ethyl acrylate.

9. Device according to any one of the preceding claims,
characterized in that the chamber support (5) consists of a thermally conducting material.

10. Device according to any one of the preceding claims,
characterized in that the chip consists of optically permeable materials, preferably of glass, borofloat glass, quartz glass, monocrystalline CaF_2, sapphire, PMMA and/or silicon.

11. Device according to any one of the preceding claims,
characterized in that the chamber body (1) comprises, at least in the zone of the chip (2) an optically permeable conical recess.

12. Device according to any one of the preceding claims,
characterized in that the chamber body disposes of an inlet (81) and an outlet (82) spatially separate from each other, for charging the sample chamber (3) and the capillary gap (7).

13. Device according to claim 12,
characterized in that the inlet (81) and the outlet (82) are arranged unilaterally to the chip (2) and are separated by a gas reservoir nose (9).

14. Device according to any one of the preceding claims,
characterized in that the chamber body (1) is sealingly and unreleasably connected with the chamber support (5) by an adhesive and/or weld connection, or is releasably connected through an additional sealing surface (43).

15. Device according to any one of the preceding claims,
characterized in that the detection area (12) is configured in the form of spots, onto which probes (56, 57, 58, 59) in the form of nucleic acid molecules are immobilized, said nucleic acid molecules preferably being DNA molecules and/or RNA molecules.

16. Device according to claim 15,
characterized in that the probes (56, 57, 58, 59) are immobilized through spacers (55).

17. Device according to any one of claims 1 through 14,
characterized in that the detection area (12) is configured in the form of spots, onto which probes (56, 57, 58, 59) in the form of peptides and/or proteins are immobilized, preferably antibodies, receptor molecules, hormones and/or pharmaceutically active peptides being concerned.

18. Device according to any one of the preceding claims,
characterized in that the evaluation of the chip-based characterization may ensue by forms of the optical detection and/or spectroscopy, particularly preferred by transmitted-light fluorescence measurement, dark field fluorescence measurement, confocal fluorescence measurement, reflected-light fluorescence measurement, photometry and/or differential photometry.

19. Device according to any one of claims 1 through 17, **characterized in that** the evaluation of the chip-based characterization ensues by a silver precipitation reaction.

20. Use of a device according to any one of the preceding claims for an almost simultaneous performance of reprocessing reactions and/or conditioning reactions and a chip-based characterization of the products.

21. Use of a device according to claim 20, the reprocessing reaction and/or conditioning reaction concerning an amplification of nucleic acids by PCR.

22. Use of a device according to claim 20, the reprocessing reaction and/or conditioning reaction concerning a reverse transcription of RNA to cDNA.

23. Use of a device according to any one of claims 1 through 17, the reprocessing reaction and/or conditioning reaction concerning a digestive process of nucleic acids by means of restriction enzymes.

24. Use of a device according to claim 20 for the almost simultaneous amplification of DNA by PCR and for the chip-based characterization of the PCR products.